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YURI GLUKHOY
440 Arguello Blvd. #1
San Francisco, CA 94118

EXAMINER

QUASH, ANTHONY G

ART UNIT PAPER NUMBER

2881

DATE MAILED: 09/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/058,153

Applicant(s)

GLUKHOY, YURI

Examiner

Anthony Quash

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-33 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on 29 January 2002 and 15 April 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Claim Objections

Claims 17,19,21, and 23 are objected for the misspelling of the word "power". It is believed that the word "powder" in the claims was meant to be "power". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 provides for the use of quadrupole lenses with angular gradient of the electrostatic field, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claim 1 is rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: the quadrupole lenses with the mass spectrometer. Appropriate correction is required

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-30 are reject to as being dependent upon a rejected base claim.

Claims 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park [2001/0054684]. As per claim 31, Park [2001/0054684] teaches a method of spectrometric mass analysis comprising the steps of providing a mass spectrometer comprising: an ion source with an ion outlet, an ion mass separation chamber having a central channel for passage of ions and connected to the ion source for receiving the ions from the ion source, electrostatic field generation means for generating an electrostatic field in the mass separation chamber, an electrostatic mirror means at the end of the mass separation chamber in the direction of the ion propagation from the ion source, an ion-electron emitting screen located between the ion mass separation

chamber and the ion source, the detector located between the mass separation chamber and the ion source, injecting packets of ions from the ion source into the ion mass separation chamber non-coaxially with the passage, generating a field in the ion separation means for directing the ions along a predetermined non-linear trajectory with gradual deceleration of the ions till points of return, reducing scattering at the points of return, returning the ions along non-linear trajectories different from the predetermined non-linear trajectories, and analyzing the ions by detecting points and times of collision of the ions with the ion-electron emitting screen. See Park [2001/0054684] abstract, figs. 3-5, 7-8, column 1-2, column 5 paragraphs 2-3, column 6 paragraph 4, and column 9 paragraph 5. However, Park [2001/0054684] does not specifically state generating an electrostatic magnetic field in the ion separation means. Park [2001/0054684] does teach that it was known to generate magnetic fields to aid in guiding/confining ions. See Park [2001/0054684] column 6 paragraph 4. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a magnetic field to aid in guiding the ions toward the ion mirror so that their mass might be detected.

As per claim 32, Park [2001/0054684] teaches that it is known to make the trajectory helical. See Park [2001/0054684] column 1 paragraph 5. In addition Park [2001/0054684] teaches preventing scattering of the points of return by means of an electrostatic mirror means. See Park [2001/0054684] figs. 3-5, 7-8.

Claims 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Park [2001/0054684]. As per claim 33, Park [2001/0054684] teaches a method of

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spectrometric mass analysis comprising the steps of providing a mass spectrometer with an ion source and an ion mass separation chamber, injecting packets of ions from the ion source into the ion mass separation chamber in a direction of ion propagation and non-coaxially with respect to the ion mass separation chamber, decelerating the ions moving along the trajectories till points of reverse, reversing the ions from the points of reverse for returning in the direction opposite to the direction of propagation and along different trajectories in the direction of propagation, and detecting the ions by time of flight and by spatially scattering the ions by their masses. However, Park [2001/0054684] does not specifically state generating a helical electrostatic field with electric potential gradually decreasing in the direction of propagation, and directing the ions along helical trajectories by means of the helical electrostatic field. Park [2001/0054684] does teach that it is known to propagate ions in along a helical trajectory. See Park [2001/0054684] column 1 paragraph 5. Although Park [2001/0054684] does not specifically state the electric potential gradually decreasing in the direction of propagation, it does teach the electric potential gradually increasing in the direction of propagation. See Park [2001/0054684] abstract, figs. 3-5, 7-8, column 1-2, column 5 paragraphs 2-3, column 6 paragraph 4, and column 9 paragraph 5. With respect to the applicant's claim of gradually decreasing the electric potential in the direction of propagation, Park [2001/0054684] teaches gradually increasing the electric potential in the direction of propagation. Park [2001/0054684] shows that gradually increasing the electric potential in the direction of propagation is an equivalent structure/method known in the art. Therefore, because these two methods for

reversing the direction of propagation of the ions were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute gradually decreasing of the electric potential in the direction of propagation for gradually increasing of the electric potential in the direction of propagation in order to reverse the direction of propagation of the ions so as to direct them toward a detector.

Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Park [625]. As per claim 33, Park [625] teaches a method of spectrometric mass analysis comprising the steps of providing a mass spectrometer with an ion source (32) and a ion mass separation chamber comprising injecting packets of ions from the ion source into the ion mass separation chamber in a direction of ion propagation and non-coaxially with respect to the ion mass separation chamber, generating an electrostatic field electric potential gradually decreasing in the direction of propagation, decelerating the ions moving till points of reverse, reversing the ions from the points of reverse for returning in the direction opposite to the direction of propagation and detecting the ions by time of flight and by spatially scattering the ions by their masses. See Park [625] abstract, figs. 2-4, col. 1 lines 5-60, col. 2 lines 5-35, col. 4 lines 49-67, col. 5 lines 5-67, col. 6 lines 55-67, col. 7 lines 20-65, col. 9 lines 35-67, and col. 10 lines 1-20. However, Park [625] does not specifically state generating a helical electrostatic field, nor moving along the helical trajectories. Park [625] does teach that it is known to direct ions in helical trajectories. See Park [625] col. 1 lines 45-50. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to direct the ions along helical trajectories as a matter of obvious design choice.

Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hanson [2002/0195557]. As per claim 33, Hanson [2002/0195557] teaches a method of spectrometric mass analysis comprising the steps of providing a mass spectrometer with an ion source and an ion mass separation chamber, injecting packets of ions from the ion source into mass separation chamber in a direction of ion propagation and non-coaxially with respect to the ion mass separation chamber, generating a helical electrostatic field, directing the ions along helical trajectories by means of helical electrostatic field, decelerating the ions moving along the helical trajectories till points of reverse, reversing the ions from the points of reverse for returning in the direction opposite to the direction of propagation and along helical trajectories different from the helical trajectories in the direction of propagation and detecting the ions by time of flight and bay spatially scattering the ion by their masses. See Hanson [2002/0195557] abstract, figs. 1, 5-6, page 1 paragraphs [0007], [0010], page 2 paragraphs [0010], [0011], [0014], [0015], page 3 paragraphs [0026], [0028], [0030], and page 4 paragraphs [0035]-[0037]. Although Hanson [2002/0195557] does not specifically state the electric potential gradually decreasing in the direction of propagation, it does teach the electric potential gradually increasing in the direction of propagation. See Hanson [2002/0195557] page 3 paragraphs [0030]. Hanson [2002/0195557] shows that gradually increasing the electric potential in the direction of propagation is an equivalent structure/method known in the art. Therefore, because these two methods for reversing the direction of propagation of the ions were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it

obvious to substitute gradually decreasing of the electric potential in the direction of propagation for gradually increasing of the electric potential in the direction of propagation in order to reverse the direction of propagation of the ions so as to direct them toward a detector.

Allowable Subject Matter

Claims 3-5,7-9,12-15,18-23,25-26,28-30 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: With respect to dependent claim 3, the prior art of record does not teach nor disclose, "... a plurality of quadrupole electrostatic lenses which are arranged in series... each of the quadrupole electrostatic lenses comprising a circular body formed by four arch-shaped poles located substantially in the a common plane ... in each of the quadrupole electrostatic lenses the poles being angularly shifted with respect to the poles of a subsequent quadrupole electrostatic lens by a selected angle" in combination with the rest of the claim. Since this aspect is not disclosed nor taught in the prior art of record, dependent claim 3 and claims 4-5,7-9,12-15,18-23,25-26,28-30 which also incorporate this aspect by their dependence upon claim 3 would be allowable over the prior art of record pending their correction of the 112 issues and the inclusion of all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent Nos. 5,614,711 to Li et al, 6,384,410 to Kawato, 4,625,112 to Yoshida, 5,563,410 to Mullock, and 5,763,875 to Kaesdorf et al. The prior art listed above is considered pertinent because of their disclosure of time-of-flight mass spectrometers comprising ion mirrors, lenses/electrodes for guiding ions, and detectors for detecting the ions.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Quash whose telephone number is (703)-308-6555. The examiner can normally be reached on M-F from 9 a.m. to 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee, can be reached on (703)-308-4116. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)-308-0956.



A. Quash 8/20/03



JOHN R. LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800